BOMBARDIER
Toronto Site
PROPRIETARY INFORMATION

PPS 25.63

PRODUCTION PROCESS STANDARD

BONDING USING DHMS A6.11
TYPE I CLASS 2 ADHESIVE

Issue 7
- This standard supersedes PPS 25.63, Issue 6.
- Vertical lines in the left hand margin indicate changes over the previous issue.
- Direct PPS related questions to christie.chung@aero.bombardier.com or (416) 375-7641.
- This PPS is effective as of the distribution date.

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1 SCOPE

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for bonding using DHMS A6.11 Type I Class 2 adhesive.

1.1.1 This PPS complements the engineering drawings that specify its use as an authorized instruction. The procedure specified in this PPS shall be followed to ensure compliance with all applicable specifications. In general, if this PPS conflicts with the engineering drawing, follow the engineering drawing. The requirements specified in this PPS are necessary to fulfil the engineering design and reliability objectives.

1.1.2 Refer to PPS 13.26 for the subcontractor provisions applicable to this PPS.

1.1.3 Procedure or requirements specified in a Bombardier BAPS, MPS, LES or P. Spec. do not supersede the procedure or requirements specified in this PPS. Similarly, the procedure and requirements specified in this PPS are not applicable when use of a BAPS, MPS, LES or P. Spec. is specified.

2 HAZARDOUS MATERIALS

2.1 Before receipt at Bombardier Toronto, all materials shall be approved and assigned Material Safety Data Sheet (MSDS) numbers by the Bombardier Toronto Environment, Health and Safety Department. Refer to the manufacturer's MSDS for specific safety data on any of the materials specified in this PPS. If the MSDS is not available, contact the Bombardier Toronto Environment, Health and Safety Department.

3 REFERENCES

3.1 PPS 13.13 - Personal Protective Respiratory Equipment.

3.2 PPS 13.26 - General Subcontractor Provisions.

3.3 PPS 13.28 - Storage Life of Adhesives, Sealants, Paints and Composite Products.

3.4 PPS 13.39 - Bombardier Toronto Engineering Process Manual.

3.5 PPS 25.66 - Cleanliness Requirements for Application of Adhesives.

3.6 PPS 31.17 - Solvent Usage.

3.7 PPS 34.08 - Application of Epoxy-Polyamide Primer (F19 & F45).

4 MATERIALS, EQUIPMENT AND FACILITIES

4.1 Materials

4.1.1 DHMS A6.11 Type I Class 2 adhesive.

4.1.2 Lint-free cotton gloves (e.g., DSC 422-1).

4.2 Equipment

4.2.1 Abrasive paper, aluminum oxide, 50 - 80 grit size and 120 - 180 grit size.

4.2.2 Bristle brush.

4.2.3 Protective wrapping, neutral Kraft paper.

4.2.4 Rubber or stitch roller.

4.3 Facilities

4.3.1 This PPS has been identified as a “Critical or Special” process according to PPS 13.39 and as such only facilities specifically approved according to PPS 13.39 are authorized to perform bonding using DHMS A6.11 Type I Class 2 adhesive according to this PPS.

4.3.2 Bombardier subcontractors shall direct requests for approval to Bombardier Supplier Quality Management. Bombardier facilities shall direct requests for approval to the appropriate internal Quality Manager.

4.3.3 Facility approval shall be based on a facility report, a facility survey and completion of a qualification test program, if required. The facility report shall detail the materials and equipment to be used, the process sequence to be followed and the laboratory facilities used to show compliance with the requirements of this PPS. Any deviation from the procedure or requirements of this PPS shall be detailed in the facility report. Based upon the facility report, Bombardier Toronto Engineering may identify additional qualification and/or process control test requirements. During the facility survey, the facility requesting qualification shall be prepared to demonstrate their capability. Once approved, no changes to subcontractor facilities may be made without prior written approval from Bombardier Aerospace Supplier Quality Management.

4.3.3.1 For approval of subcontractor facilities to perform bonding using DHMS A6.11 Type I Class 2 adhesive according to this PPS, completion of a test program and submission of suitable test samples representative of production parts is required. Test samples shall meet the requirements specified in section 6.

5 PROCEDURE

5.1 Preparation of Parts

5.1.1 Wear clean cotton gloves when handling bonding surfaces. Do not touch or contaminate prepared surfaces with bare hands or other foreign objects.

5.1.2 Ensure the bonding surfaces of aluminum alloy parts and cadmium plated parts have been primed with F19 according to PPS 34.08.

5.1.3 Immediately before applying adhesive, prepare the bond surfaces as specified in Table I.

TABLE I - PREPARATION OF PARTS FOR ADHESIVE BONDING

MATERIAL	CLEANING PROCEDURE
All F19 primed parts	Solvent clean according to PPS 31.17.
Unprimed metal parts	Solvent clean according to PPS 31.17.
Unprimed fibreglass (including Kevlar laminates and composites)	Step 1. Lightly scuff the bonding surfaces with 120 - 180 grit abrasive paper. Step 2. Solvent clean according to PPS 31.17.
Unprimed phenolic (except Formica, Arborite, etc.)	Step 1. Lightly scuff the bonding surfaces with 120 - 180 grit abrasive paper. Step 2. Solvent clean according to PPS 31.17.
Unprimed Formica, Arborite, etc.	Solvent clean according to PPS 31.17.
Unprimed plastic parts (except Kevlar and fibreglass)	Solvent clean according to PPS 31.17.
Rubber parts (neoprene, nitrile, Buna-N, etc.)	Solvent clean according to PPS 31.17.
Rubber parts (Silicones)	Step 1. Solvent clean according to PPS 31.17. Step 2. Lightly scuff the bonding surfaces with 120 - 180 grit abrasive paper. Step 3. Solvent clean according to PPS 31.17.
Wood (except balsa)	Step 1. Sand bond surfaces with 50 - 80 grit abrasive paper. Step 2. Remove residual dust with clean compressed air.
Porous materials (Velcro, fabrics, balsa, cork, etc.)	Do not clean porous materials in any way. If the bonding surface is contaminated, refer the part to Liaison Engineering.
Rulon A	Solvent clean according to PPS 31.17.
Flexible polyurethane foam	Solvent clean according to PPS 31.17.
Rigid polyurethane foam	Step 1. Lightly scuff the bonding surfaces with 120 - 180 grit abrasive paper. Step 2. Remove residual dust with clean compressed air.

5.2 Preparation of Adhesive

5.2.1 Thoroughly agitate the adhesive using a paint shaker. Ensure that all solids are dispersed by scraping the bottom of the container with a screwdriver or similar tool.

5.3 Bonding

5.3.1 General

5.3.1.1 Perform bonding in a clean area according to PPS 25.66.

5.3.2 Open Time Method

5.3.2.1 The open-time method is recommended if only a small area is to be bonded or if one or both of the materials is porous.

5.3.2.2 Perform bonding according to the open time method as follows:

Step 1. Using a suitable bristle brush, apply a thin, uniform coat of adhesive to both bonding surfaces making as few strokes as possible.

Step 2. If necessary, apply two or more coats of adhesive to porous surfaces to ensure that sufficient adhesive remains on the surface. Allow each preceding coat to air dry before the next coat is applied.

Step 3. Allow the final coat of adhesive to air dry until it is tacky, but does not transfer to the finger when touched lightly.

Step 4. Press the parts together and roll down with a rubber or stitch roller to ensure intimate contact over the full bonding surface.

5.3.3 Re-activation Method

5.3.3.1 The re-activation method is recommended if large areas of non-porous material are to be bonded or a strong intimate bond is desired.

5.3.3.2 Perform bonding according to the re-activation method as follows:

Step 1. Apply a thin, uniform coat of adhesive to both bonding surfaces using a suitable bristle brush making as few strokes as possible.

Step 2. If necessary, apply two or more coats of adhesive to porous surfaces to ensure sufficient adhesive remains on the surface

Step 3. Allow the final coat of adhesive to air dry for a minimum of 2 hours.

Step 4. If the parts will not be bonded on the same shift as when the adhesive was applied, cover the adhesive coated surfaces with Kraft paper after the adhesive has dried to a tack-free condition.

Step 5. Re-activate the dry adhesive coating of the less porous material by wiping with a clean cloth dampened with the solvent specified in PPS 31.17.

Step 6. Immediately join the parts together and roll down with a rubber or stitch roller or press down firmly with the fingers to ensure intimate contact over the full bonding area.

5.4 Curing

5.4.1 Allow the bond to cure at room temperature (65°F minimum) for at least 24 hours before further working the assembly or installing it in the aircraft.

5.5 Clean-Up

5.5.1 Remove adhesive from tools and equipment by solvent cleaning according to PPS 31.17.

6 REQUIREMENTS

6.1 Bonded parts and assemblies shall have intimate contact over the full bonding surface.

6.2 Visual indication of poor adhesion is not acceptable.

6.3 Bonded assemblies shall be allowed to cure at room temperature (65°F minimum) for a minimum of 24 hours before being further worked or installed in the aircraft.

7 SAFETY PRECAUTIONS

7.1 Keep adhesive away from fire and other sources of ignition.

7.2 Wear protective respiratory equipment according to PPS 13.13 when working with adhesive.

7.3 Ensure sufficient ventilation is supplied at all times when using adhesive. Avoid inhalation of fumes or vapours from adhesive.

7.4 Wash hands thoroughly with soap and water immediately after using adhesive.

7.5 Avoid skin contact with adhesive. Do not use protective hand cream as it may contaminate cleaned or adhesive coated surfaces. If skin contact occurs, wash thoroughly with soap and water.

7.6 Wear safety eye glasses when handling adhesive. If eye contact occurs, immediately flush eyes in a directed stream of water for at least 15 minutes while forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissue. Contact the Health Centre and a physician.

7.7 Observe standard plant safety precautions when performing the procedure specified herein.

7.8 Refer to PPS 31.17 for the safety precautions for handling and using solvents.

8 PERSONNEL REQUIREMENTS

8.1 This PPS has been categorized as a “Critical or Special Process” according to PPS 13.39. Refer to PPS 13.39 for personnel requirements.

9 STORAGE OF ADHESIVE

9.1 Store DHMS A6.11 Type I Class 2 adhesive at a temperature of 2°C to 27°C (35°F to 80°F) according to the precautions necessary for flammable materials.

9.2 Refer to PPS 13.28 for the storage life of the adhesive.

9.3 Ensure adhesive containers are clearly marked with the storage life expiry date.

9.4 Keep adhesive containers tightly closed when not in use.